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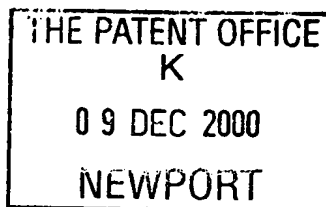
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Dated 17 September 2001

Request for grant of a patent



The Patent Office

Cardiff Road
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1. Your reference P27392-/GMM/RBA/NGO

2. Patent Application Number **0030137.4**
(the Patent Office will fill in this part) **09 DEC 2000**

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

Caterpillar Inc.
100 N.E. Adams Street
Peoria, IL
61629 - 6490
USA

Patents ADP number *(if you know it)* **367128001**

If the applicant is a corporate body, give the country/state of its incorporation

Incorporated in the State of Delaware, USA

11DEC00 E590493-2 D02884
F01/7700 0.00-0030137.4

4. Title of the invention "Work Machine Arrangement"

5. Name of your agent *(if you have one)* Murgitroyd & Company

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

Patents ADP number *(if you know it)*

373 Scotland Street
Glasgow
G5 8QA

1198013 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and <i>(if you know it)</i> the or each application number	Country	Priority application number <i>(if you know it)</i>	Date of filing <i>(day / month / year)</i>
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing <i>(day / month / year)</i>
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8. Is a statement of inventorship and of right to grant a patent required in support of this request? *(Answer 'Yes' if:*

a) any applicant named in part 3 is not an inventor, or

b) there is an inventor who is not named as an applicant, or

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Yes

Patents Form 1/77

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Description 6 ✓

Claim(s) 3 ✓

Abstract 1 ✓

Drawing(s) 2 + 2 RIN

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Priority documents -

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Statement of inventorship and right
to grant of a patent (Patents Form 7/77) -

Request for preliminary examination
and search (Patents Form 9/77) 1 ✓

Request for substantive examination
(Patents Form 10/77) -

Any other document
(please specify) -

11. I/We request the grant of a patent on the basis of this application

Signature

Murgitroyd & Company

Date 8 December 2000

Murgitroyd & Company

12. Name and daytime telephone number of
person to contact in the United Kingdom Naoise Gordon 0141 307 8400

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1 WORK MACHINE ARRANGEMENT

2

3 Technical Field

4 This invention relates to a work machine
5 arrangement and more particularly to a work machine
6 arrangement in which the work machine has a rear-
7 mounted radiator oriented substantially parallel to a
8 longitudinal axis of a work machine arm.

9

10 Background Art

11 Typically, work machines of the type often
12 referred to as boom trucks or telehandlers use an
13 attachment mounted to a telescopic arm to raise loads
14 to, or lower loads from, an elevated position. The
15 extension of the arm, or its reach, is typically
16 limited by such physical parameters as the machine's
17 body size, weight, and engine placement.
18 Consequently, if the end user desires to obtain a
19 machine with a needed reach, the operator must obtain
20 a machine having those physical parameters
21 corresponding to the needed reach requirement.
22 However, it may oftentimes be the case in which the

1 size and weight of the machine needs to be minimized
2 while requiring a reach range exceeding the machines
3 physical parameters. This situation may arise, for
4 example, if the work machine is typically transported
5 to a work site by another machine such as a highway
6 truck, airplane or train.

7 Prior art attempts to solve the
8 aforementioned problems can be found in U.S. Patent
9 No. 3,985,248, issued on Oct. 12, 1976 to Reinald D.
10 Liegel et al., and U.S. Patent No. 6,024,232, issued
11 on Feb. 15, 2000 to Kenneth Helgesson. Both teach
12 boom trucks in which the arm is pivotally coupled to
13 the boom truck body at a horizontal location
14 substantially above the cab. Although both designs
15 may be adequate for their respective intended
16 purposes, both designs may be problematic for those
17 applications in which the vehicle height is a concern.

18 The present invention is directed to
19 overcoming one or more of the problems as set forth
20 above.

21

22 Disclosure of the Invention

23 According to an aspect of the present
24 invention, a work machine arrangement for a work
25 machine is provided. The work machine has a work
26 machine body and an extensible arm, connected to the
27 work machine body, having an arm longitudinal axis.
28 An engine cooling apparatus is mounted to the work
29 machine body. The engine cooling apparatus has a
30 engine cooling apparatus longitudinal axis oriented
31 substantially parallel to the arm longitudinal axis.

1 Brief Description of the Drawings

2 Fig. 1 is a diagrammatic side elevation view
3 of a work machine that embodies the principles of the
4 present invention.

5 Fig. 2 is a diagrammatic top plan view of a
6 rear portion of the work machine of Fig. 1.

7 Fig. 3 is a diagrammatic side elevation view
8 of the rear portion of the work machine of Fig. 1
9 illustrating two orientations of the arm.

10

11 Best Mode for Carrying Out the Invention

12 Referring to the drawings, an exemplary work
13 machine of the type typically termed a telehandler or
14 boom truck is shown generally at 100 and comprises a
15 body 101 having a front portion 104, a rear portion
16 105, and a body longitudinal centerline denoted 108
17 extending between the front and rear portions 104, 105.
18 The body 101 includes a cab portion 109 which is
19 preferably oriented to either side of the body
20 longitudinal centerline 108 (as shown best in Fig. 2).
21 An engine 112 is mounted adjacent the rear portion 105
22 and provides the motive force used to drive a set of
23 wheels 113 coupled to the work machine 100. Also
24 shown is a cooling apparatus, preferably a radiator
25 116, operatively coupled to the engine 112, for
26 thermally regulating the engine's temperature.

27 An arm 117 is coupled to the body 101
28 adjacent to the rear portion 105 of the work machine
29 100 and includes an arm longitudinal axis 118. The
30 arm 117 preferably comprises an extensible arm, and
31 more preferably a telescopic arm having a

1 substantially hollow base portion 120 sized to receive
2 a telescoping portion 121 which is extendable and
3 retractable, relative to the base portion 120, by
4 conventional means such as, for example, hydraulic
5 pressure. The telescoping portion 121 includes a
6 distal end 124 which is adapted to receive an
7 assortment of attachments including a fork 125, as
8 shown. Alternatively, the arm 117 may include
9 multiple sequentially extendable and retractable
10 concentric telescoping sections. The arm 117 is
11 preferably pivotally coupled to the body 101 about a
12 pivot pin 128 and is operable via a hydraulic cylinder
13 (not shown) to pivot the arm 117, relative to the body
14 101, in the direction of arrows 130 and 131. For
15 reasons which should become apparent as this
16 disclosure progresses, the pivotal connection at the
17 pivot pin 128 is preferably located so as to provide
18 the arm with an elongated arm tail portion 134
19 extending from the pivot pin 128 towards the rear
20 portion 105 of the work machine 100.

21 With reference to Fig. 2, shown is the rear
22 portion 105 of the work machine 100 with a portion of
23 the body 101 removed for clarity. As shown, the
24 exemplary radiator 116 described herein is preferably
25 substantially rectangular in cross section having a
26 radiator longitudinal axis denoted 201. The radiator
27 116 is mounted to the rear portion 105 such that the
28 radiator longitudinal axis 201 is substantially
29 parallel to the arm longitudinal axis 118. As should
30 be appreciated, by orienting the radiator 116 in the
31 aforementioned manner, a longer arm tail portion 134

1 may be provided which allows the arm 117 to have a
2 greater reach without any substantial modifications to
3 either the body 101 or location of the pin 128. In
4 particular, for those work machines 100 of the type
5 described herein in which the arm 117 is preferably
6 mounted on one side (denoted herein as 202) of the
7 body longitudinal centerline 108, the placement of the
8 radiator longitudinal axis 201 on the other side
9 (denoted herein as 202') of the body longitudinal
10 centerline 108 minimizes substantial modifications of
11 the body 101 to accommodate the preferred orientation
12 of the radiator 116.

13 Shown in Fig. 3 is an elevational view of
14 the rear portion 105 of the work machine 100 with the
15 arm 117 positioned in different stages of articulation
16 about pin 128. As shown, clockwise articulation of
17 the arm 117 about pin 128 causes the arm tail portion
18 134 to sweep in an arc denoted 300. As should be
19 apparent to those of ordinary skill in such art, any
20 interference between the extended arm tail section 134
21 and the radiator 116 which would otherwise occur but
22 for the placement of the radiator 116 in the
23 aforementioned manner is eliminated.

24

25 Industrial Applicability

26 In the operation of the work machine 100
27 shown in Fig. 1, articulation of the arm 117 about pin
28 128 elevates the fork 125 to the desired vertical
29 coordinate, whereas extension or retraction of the
30 telescoping portion 121 places the fork 125 at the
31 desired horizontal coordinate from the work machine

1 100. For those work machines 100 having rear mounted
2 radiators 116, the maximum reach of the arm 117 is
3 typically limited by the physical constraints imposed
4 upon the vehicles such as, for example, the specified
5 size and weight constraints of the work machine 100 as
6 well as the placement of the radiator 116.

7 Orientating the radiator 116 such that the
8 radiator's longitudinal axis 201 is substantially
9 parallel with the arm longitudinal axis 118, as shown
10 best in Fig. 2, allows for an extended arm tail
11 portion 134. This, in turn, provides the work machine
12 100 with an increased reach while maintaining
13 substantially the same body size, weight, and pin 128
14 location. As should also be appreciated by those of
15 ordinary skill in such art, by orienting the radiator
16 116 in the aforementioned manner, the size of the
17 radiator 116 need no longer be constrained by the
18 transverse size limitation of the rear portion,
19 thereby allowing the radiator 116 to have an increased
20 longitudinal length and increased height resulting in
21 the radiator 116 having an increased cooling capacity.

22 Other aspects, objects and advantages of
23 this invention can be obtained from a study of the
24 drawings, the disclosure and the appended claims.

Claims

1
2
3 1. A work machine arrangement for a work
4 machine (100) having an engine (112), comprising:
5 a work machine body (101);
6 an extensible arm (117) connected to said
7 work machine body (101), said extensible arm (117)
8 having an arm longitudinal axis (118); and
9 an engine cooling apparatus (116) mounted to
10 said work machine body (101), said engine cooling
11 apparatus (116) having a engine cooling apparatus
12 longitudinal axis (201) oriented substantially
13 parallel to said arm longitudinal axis (118).
14

15 2. The work machine arrangement as set forth
16 in claim 1 wherein said engine cooling apparatus
17 comprises a radiator (116).
18

19 3. The work machine arrangement as set forth
20 in claim 1 or 2 wherein said arm (117) comprises a
21 telescoping arm.
22

23 4. The work machine arrangement as set forth
24 in any preceding claim wherein said arm (117) is
25 pivotable relative to said work machine body (101).
26

27 5. The work machine arrangement as set forth
28 in any preceding claim wherein:

29 said arm (117) comprises a telescoping arm;
30 and

1 said arm (117) is pivotable relative to said
2 work machine body (101).

3

4 6. The work machine arrangement as set forth
5 in any preceding claim wherein:

6 said work machine body (101) has a body
7 longitudinal centerline (108);

8 said arm longitudinal axis (118) is offset
9 to one side (202) of said body longitudinal centerline
10 (108); and

11 said engine cooling apparatus longitudinal
12 axis (201) is offset to the other side (202') of said
13 body longitudinal centerline (108).

14

15 7. The work machine arrangement as set forth
16 in any preceding claim wherein:

17 said work machine body (101) includes a rear
18 portion (105); and

19 said engine cooling apparatus (116) is
20 mounted to said rear portion (105) of said work
21 machine body (101).

22

23 8. A work machine arrangement, comprising:

24 a work machine body (101) having a rear
25 portion (105), said work machine body (101) having a
26 body longitudinal centerline (108);

27 an engine (112) coupled to said work machine
28 body (101);

29 a telescoping arm (117) pivotally connected
30 to said rear portion (105) of said work machine body
31 (101), said telescoping arm (117) having an arm

1 longitudinal axis (118) located on one side (202) of
2 said body longitudinal centerline (108); and
3 an engine cooling apparatus (116) mounted to
4 said rear portion (105) of said work machine body
5 (101), said engine cooling apparatus (116) having an
6 engine cooling apparatus longitudinal axis (201)
7 oriented substantially parallel to said arm
8 longitudinal axis (118), said engine cooling apparatus
9 (116) located on the other side (202') of said body
10 longitudinal centerline (108).
11

12 9. The work machine arrangement as set forth
13 in Claim 8 wherein said engine cooling apparatus (116)
14 comprises a radiator.
15

16 10. A work machine arrangement for a work
17 machine having an engine cooling apparatus
18 substantially as hereinbefore described with reference
19 to and as shown in the accompanying drawings.
20

21 11. A work machine arrangement
22 substantially as hereinbefore described with reference
23 to and as shown in the accompanying drawings.

1 Abstract of the Disclosure

2
3 WORK MACHINE ARRANGEMENT

4
5 In the operation of work machines of the
6 type having an extensible arm, the maximum reach of
7 the arm for a given work machine is limited by such
8 factors as the vehicle's weight, body size and engine
9 placement. The present invention provides for a work
10 machine arrangement in which a work machine (100) has
11 an engine cooling apparatus (116) mounted to the work
12 machine body (101) such that the engine cooling
13 apparatus's longitudinal axis (201) is oriented
14 substantially parallel to the arm longitudinal axis
15 (118).

1/2

FIG. 1.

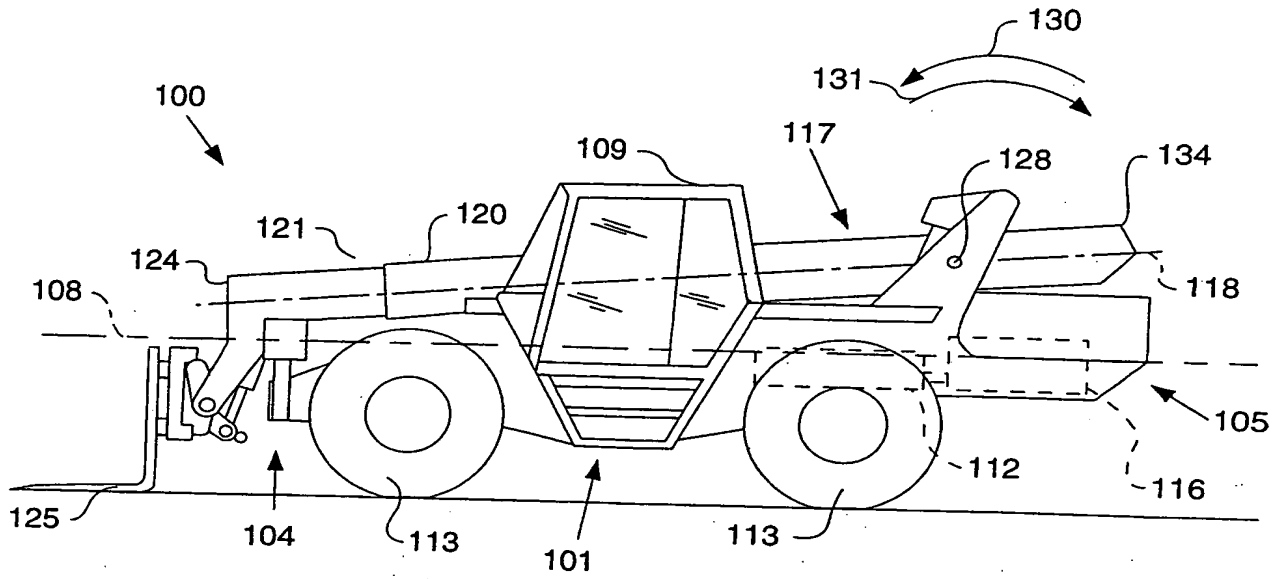


FIG. 2.

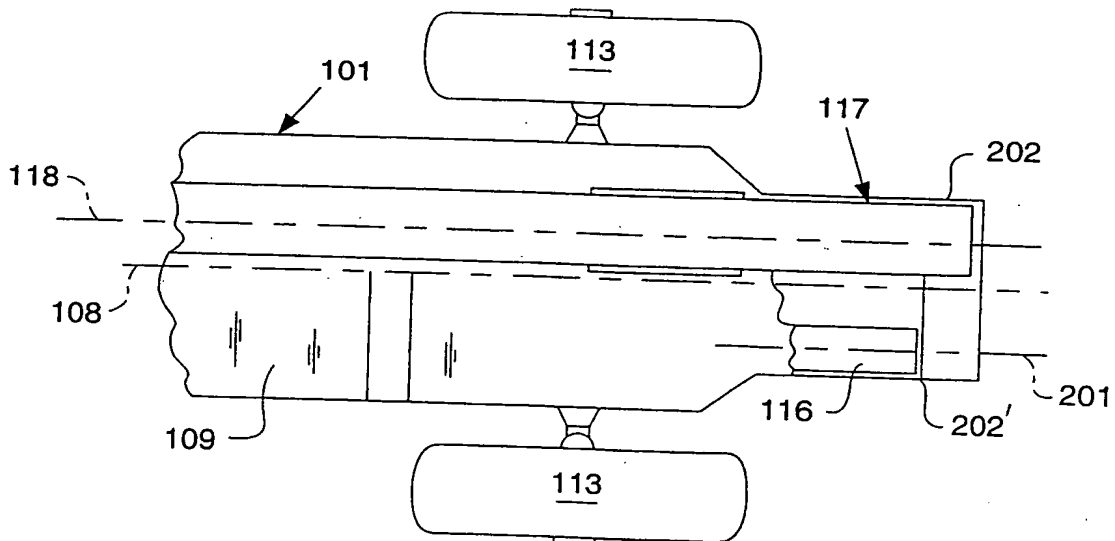


FIG. 3.

